ABSTRACT

The improved pulse oximeter preprocesses the sets of red and infrared signals received from the probe to remove ambient light, to remove noise, and to de-exponeniate the signals. The linearity of the processed red and infrared signals allows the use of statistical techniques such as linear regression and linear correlation to fit a best fit straight line to the set of pairs of processed red and infrared data points and to measure the goodness of the straight line fit to these data points. The result of this analysis is a linear regression slope and a goodness of fit correlation coefficient. The correlation coefficient is a measure of the linearity of the input data points and, if less than a predetermined threshold, it indicates that a distorted signal has been received from the probe. This permits the pulse oximeter to detect probe off conditions and/or motion in the patient. The computed linear regression slope is converted to a RRatio which is used in a empirical calibration formula to compute the average SpO2 value. The minimum size of the data set required for high confidence calculations using this apparatus is significantly smaller than the a pulse period and permits faster response to changing input data.